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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
MARTIN KREYENSCHMIDT, ET AL.	: EXAMINER: COONEY, J.
SERIAL NO: 10/512,081	:
FILED: NOVEMBER 8, 2004	: GROUP ART UNIT: 1796
FOR: METHOD FOR PRODUCING POLYURETHANE FOAMED MATERIALS HAVING AN IMPROVED LONG-TERM STABILITY	:

APPEAL BRIEF UNDER 37 C.F.R. §41.37

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Responsive to the Interview with the Examiner of December 8, 2008, the Advisory Action of November 19, 2008 and the Final Office Action of July 30, 2008 and further to the Notice of Appeal filed on January 30, 2009, Applicants request the Board of Appeals and Interferences review and overturn the rejections in the above-identified application.

I. REAL PARTY IN INTEREST

The real party in interest is BASF AG of Ludwigshafen, Germany.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1, 3-6, 8-21 are active in the present application. Claims 12 and 19-21 are presently withdrawn from active prosecution. Claims 1, 3-6, 8-11 and 13-18 are rejected.

The rejection of Claims 1, 3-6, 8-11 and 13-18 is appealed.

IV. STATUS OF THE AMENDMENTS

The Amendment filed on April 30, 2008 was entered. The Request for Reconsideration filed October 30, 2008, was considered in part as indicated in the Advisory Action of November 19, 2008.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 1 is drawn to a process for the preparation of a polyurethane foam of improved long-term stability. Stability characteristics of polyurethane foams including resistance to hydrolysis, photooxidation and thermal oxidation leading to cleavage of polyurethane chains are described on page 1, line 18 through page 2, line 11. The claimed process includes a step of reacting a polyisocyanate with a compound having at least two hydrogen atoms reactive with isocyanate groups. Polyisocyanates and compounds having at least two hydrogen atoms reactive with isocyanate groups are described on page 8, line 43 through page 9, line 16. Reacting is described on page 13, lines 30-31 and in the examples on pages 14-15. Reacting is carried out in the presence of one or more inhibitors. Inhibitors are described on page 1, lines 12-16; page 2, lines 13-18; page 3, lines 11 through page 5, line 2; and page 6, lines 6-45.

Dependent Claim 3 recites an inhibitor that is a wax with a particular melting point. Such waxes are described at page 3, lines 16-30.

Dependent Claim 4 describes an inhibitor that is a wax with a particular heat fusion. Such inhibitors are described on page 4, lines 14-18.

Dependent Claim 5 recites a wax of a particular melting point. Such waxes are described on page 3, lines 16-23.

Dependent Claim 6 recites a wax having one or more polar groups. Such waxes are described in the paragraph bridging pages 4 and 5.

Dependent Claim 8 recites an encapsulated inhibitor in particle form. Such inhibitors are described on page 6, lines 22-35.

Dependent Claim 9 describes a wax inhibitor of particular particulate form. Such waxes are described on page 6, lines 22-35.

Dependent Claim 10 is drawn to a polyurethane prepared by the process of Claim 1. Support is found in the Examples.

Dependent Claim 11 recites particular inhibitors such as those disclosed on page 6, lines 6-14.

Dependent Claim 13 recites an inhibitor encapsulated in a polar polyolefin wax. Such inhibitors are described in the paragraph bridging pages 4 and 5.

Dependent Claim 14 recites particular polar polyolefin waxes of certain molecular weight. Such inhibitors are described on page 4, lines 30-38.

Dependent Claim 15 recites a process in which the inhibitor is present in a particular amount by weight. Such processes are described on page 8, lines 35-38.

Dependent Claim 16 further describes the inhibitor. Support for Claim 16 is found throughout the specification.

Dependent Claim 17 recites particular waxes of certain melting point range. Support for Claim 17 is found in the paragraph bridging pages 3 and 4.

Dependent Claim 18 recites a particular encapsulated inhibitor of certain thermodynamic characteristics selected from the Markush group recited in the claim. Support for Claim 18 is found on pages 3-5 of the specification.

VI. GROUNDS OF REJECTION

1). Claims 1, 3-6, 8-11 and 13-18 are rejected as obvious under the meaning 35 U.S.C. §103(a) over Dany (U.S. 3,847,843) in combination with Kreyenschmidt (DE 10050417).

2). Claims 1, 3-6, 8-11 and 13-18 are rejected as obvious under the meaning of 35 U.S.C. §103(a) over Arlt (WO 00/66643) in combination with Kreyenschmidt.

VII. ARGUMENTS

The rejection of the claims as obvious over Dany in combination with Kreyenschmidt, or Arlt in combination with Kreyenschmidt, should be overturned because: (i) those of ordinary skill in the art would have had no expectation of success in modifying the references in the manner asserted by the Office in view of Dany's disclosure that stabilizers (asserted by the office to be the inhibitors of the present claims) do not affect polyurethane foaming reactions, (ii) Applicants' factual evidence rebutting the obviousness rejection, and (iii) Kreyenschmidt discloses an encapsulated catalyst not the encapsulated inhibitor of the present claims.

1-(i)). Present Claim 1 is drawn to a process that includes reacting a polyisocyanate and a compound having at least two hydrogen atoms that are reactive with isocyanate groups.

The reacting is carried out in the presence of an inhibitor that is encapsulated in a wax and is one or more of the inhibitors explicitly recited in a Markush group of Claim 1.

The Office admits that Dany does not disclose the use of a wax-encapsulated inhibitor in a process of reacting a polyisocyanate with, for example, a polyol (see page 3 of the July 30, 2008 Office Action). The Office relies on Kreyenschmidt as evidence that it would be

obvious to encapsulate the stabilizer that is present in the Dany process "for the purpose of inhibiting the active agent's effect" (see page 3 of the July 30, 2008 Office Action).

Appellants submit that the Office's combination of Dany and Kreyenschmidt is improper in view of Dany's explicit teaching that stabilizers do not affect the Dany process. Dany discloses the following in this regard:

> The stabilizers of the present invention were used in the production of polyurethane foam plastics. They could **not be found to affect the foaming process**, in a manner determinable by testing. The expansion time and the non-tack range, which critically determine the commercial production of foam plastics, could **not be found to have been changed**. Nor could the stabilizer addends of the present invention be found to effect in a manner determinable by testing the physical properties of final foam plastics, such as compressive or tear strength, elasticity, dimensional stability, unit weight or the open cellular structure of soft foam plastics...

See column 3, lines 62-74 of Dany (emphasis added).

Dany discloses that the inclusion of a stabilizer, e.g., a compound that functions to stabilize polyurethane foam plastics (see column 1, lines 15-17 of Dany), has no effect on the reacting. The Office asserts that the Dany stabilizer is the inhibitor of the present claims. Appellants submit that there would be no motivation to encapsulate the Dany stabilizer in view of Dany's disclosure that stabilizers have no effect on polyurethane foaming reactions.

The Office asserts that it would have been obvious "to have encapsulated the active agents of Dany et al. in the manner provided for by..." Kreyenschmidt "...for the purpose of inhibiting their active affects..." (see the last full paragraph on page 3 of the July 30, 2008 Office Action). The Office's assertion makes no sense on its face. Dany explicitly discloses that the stabilizer has not affect on either the foaming process or the foams prepared therefrom. Encapsulating stabilizers that have no effect on the foaming process or on the foam produced therefrom would have no effect and would result in only an unnecessary

expense and complication. Appellants thus submit that the rejection of the claims over Dany is improper and should be overturned.

1-(ii)). The data of Appellants' original specification rebuts the Office's assertion of obviousness by showing that the presently claimed invention provides an unexpected result. As discussed above, the cited art, e.g., Dany, discloses a process of forming a polyurethane foam in the presence of a stabilizer which the Office asserts is the same as or similar to the inhibitor of the present claims.

Dany discloses that the stabilizer has no effect on the foaming process or on the foam formed by the process. Appellants's data prove that the claimed process is in fact different from the process of Dany and, further, provides a different foam in comparison to a process in which an inhibitor is not encapsulated. Table 1 on page 16 of the specification is relevant in this regard. Comparative Examples 2-4 each include an unencapsulated inhibitor (i.e., adipic acid, dimethylpropionic acid, and maleic anhydride, respectively). The reaction characteristics are summarized by the cream, rise time, fiber time (all in seconds), like measurements made after storing the compositions for ten days.

The Comparative Examples are similar to inventive Examples 1-3 except that the comparative examples exclude an encapsulated inhibitor. There are substantial differences in the cream time, rise time and fiber time of the comparative examples in view of the inventive examples. The inventive examples are able to provide a cream time of 14 seconds whereas the comparative examples provide cream times in the range of 19-25 seconds. The rise time for the inventive examples is 85-90 seconds whereas the rise time for Comparative Examples 2-4 is 145-165 seconds. Likewise, the fiber time of the inventive examples ranges from 125-140 seconds whereas that for the Comparative Examples 2-4 ranges from 170-200 seconds.

The data of Table 1 of the original specification makes it readily evident that encapsulating an inhibitor has a substantial effect on the polyurethane foaming process.

Table 1 on page 16 also provides data proving that the foam resulting from the reacting is substantially different in comparison to the foam formed in the absence of an encapsulated inhibitor. The inventive examples provide an initial tensile strength of 90-96 kPa whereas Comparative Examples 2-4 provide an initial tensile strength of only 88-94. Appellants submit that the data of the original specification prove that a foam prepared by reacting a polyisocyanate and, for example, a polyol, is substantially affected when the reacting is carried out in the presence of an encapsulated inhibitor in comparison to carrying out the reaction in an unencapsulated inhibitor.

Appellants submit that the data of Table 1 of the specification must be unexpected in view of Dany's explicit disclosure that the presence of a stabilizer which the Office asserts is the same or similar to the inhibitor to the present claims has no effect on the foaming process and the foams formed therefrom.

The Board should overturn the rejections in view of Appellants showing of unexpected results.

2-(i)). As was the case for the rejection of the claims as obvious over the combination of Dany and Kreyenschmidt, the Examiner errs in rejecting the claims as obvious over the claims of Arlt and Kreyenschmidt.

The Office admits that Arlt does not disclose encapsulating an active agent in a wax (see the paragraph bridging pages 4 and 5 o the July 30, 2008 Office Action). The Examiner relies on Kreyenschmidt as evidence that it would be obvious to encapsulate an active agent in a wax "for the purpose of inhibiting the active agents' effects" (see the last sentence on page 4 of the July 30 Office Action).

As explained above in the arguments regarding the combination of Dany and Kreyenschmidt, Appellants submit that the evidence of record likewise contradicts the Office's assertion of obviousness of the present claims in view of the Arlt and Kreyenschmidt references. The evidence of record stabilizers present in a polyurethane foaming reaction have no effect on the foaming reaction and no effect on the resultant foam. Appellants submit that there would be no motivation for one of ordinary skill in the art to modify Arlt in the manner of Kreyenschmidt for the reason that the evidence of record, i.e., Dany, discloses that such a modification would be pointless because the stabilizer (e.g., active agent) has no effect on foaming and/or the foams produced therefrom.

Appellants thus request the Board overturn the rejections of the claims in view of the combination of Arlt and Kreyenschmidt.

2-(ii)). Appellants' original specification includes data rebutting the Office's assertion of obviousness.

Appellants submit that based on the evidence of record one of ordinary skill in the art would conclude that the presence of a stabilizer and/or an active agent during polyurethane foaming (e.g., reaction of a polyisocyanate with a polyol) would have no effect on the reacting or on the foams prepared from the reacting. Appellants' data proves that an unexpected result is obtained by Appellants' claimed invention. Appellants' data show that encapsulating the inhibitor has a substantial effect on both the foaming process and the resulting foam (see the discussion and arguments above in section "1-ii)." with respect to the rejection of the claims as obvious over the combination of Dany and Kreyenschmidt.

2-(iii)). The Examiner relied on Kreyenschmidt as evidence that one of skill in the art would modify Dany and/or Arlt in a manner such as to arrive at the presently claimed invention.

Appellants submit that the combination of Kreyenschmidt with Arlt and/or Dany makes no sense. Present Claim 1 recites "inhibitors are encapsulated in a wax". In contrast,

at best, Kreyenschmidt discloses a process and/or catalyst system in which a catalyst is encapsulated. An inhibitor and a catalyst are two different things. Likewise, the stabilizer of Dany is different from the catalyst of Kreyenschmidt. Where Dany discloses that the stabilizer has no effect on the foaming process, Kreyenschmidt points out that catalysts fundamentally influence the foaming process. For example:

> The amount of catalyst used in a PUR system cannot be increased at will, however, since the catalysis also fundamentally influences the starting times of the systems.

See paragraph [0003] of the English translation of Kreyenschmidt.

Likewise, the inhibitors of Arlt are different from the catalysts of Kreyenschmidt. Appellants submit that the Office's combination of Arlt and Kreyenschmidt is improper because the Office has not provided any reason why one of ordinary skill in the art would be motivated by the disclosure of an encapsulated catalyst to encapsulate an inhibitor when catalysts and inhibitors function in an essentially contradictory manner; namely, a catalyst speeds a reaction whereas an inhibitor slows a reaction.

Applicants thus request withdrawal of the rejections.

2-(iii)). The Examiner relied on Kreyenschmidt as evidence that one of skill in the art would modify Dany and/or Arlt in a manner such as to arrive at the presently claimed invention.

Appellants submit that the combination of Kreyenschmidt with Arlt and/or Dany makes no sense. Present Claim 1 recites an "inhibitors are encapsulated in a wax". In contrast, at best, Kreyenschmidt discloses a process and/or catalyst system in which a catalyst is encapsulated. An inhibitor and a catalyst are two different things. Likewise, the stabilizer of Dany is different from the catalyst of Kreyenschmidt. Where Dany discloses that the stabilizer has no effect on the foaming process, Kreyenschmidt points out that catalysts fundamentally influence the foaming process. For example:

> The amount of catalyst used in a PUR system cannot be increased at will, however, since the catalysis also fundamentally influences the starting times of the systems.

See paragraph [0003] of the English translation of Kreyenschmidt.

Likewise, the inhibitors of Arlt are different from the catalysts of Kreyenschmidt. Appellants submit that the Office's combination of Arlt and Kreyenschmidt is improper because the Office has not provided any reason why one of ordinary skill in the art would be motivated by the disclosure of an encapsulated catalyst to encapsulate an inhibitor when catalysts and inhibitors function in an essentially contradictory manner; namely, a catalyst speeds a reaction whereas an inhibitor slows a reaction.

Appellants thus further request withdrawal of the rejection.

Dependent Claims 11-12 and 18 recite particular inhibitors. Kreyenschmidt does not disclose the inhibitors of Claims 11-12 and 18. Instead, Kreyenschmidt discloses catalysts such as organic amines (see paragraph [0017] of the English translation of Kreyenschmidt). Appellants submit that Claims 11-12 and 18 are further patentable over the cited art in view of Kreyenschmidt's silence with respect to encapsulating the inhibitor compounds o the dependent claims.

For the reasons stated above, Appellants urge the Board to overturn the rejection of the claims.

Respectfully submitted,

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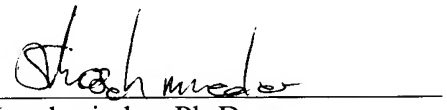

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VIII. CLAIM APPENDIX

Claim 1 (Previously Presented): A process for the preparation of a polyurethane foam having improved long-term stability, comprising:

reacting

a) a polyisocyanate with

b) one or more compounds having at least two hydrogen atoms reactive with isocyanate groups, in the presence of one or more inhibitors in an amount of from 0.1% to 20% by weight, based on the weight of the polyurethane,

wherein the inhibitors are encapsulated in a wax which is inert under the conditions of the polyurethane preparation, and

wherein the inhibitor is at least one selected from the group consisting of an α,β-unsaturated compound, a carboxylic acid, a carboxylic acid derivative, a ketone, an aldehyde, a lactone, a lactam, a cyclic ether, an ester, a sulfonic acid, a cyclic sulfonic ester, a sulfone, a salt of a metal of subgroup I, a salt of a metal of subgroup II, a salt of a metal of subgroup VIII, an organic cyclic compound, an inorganic acid, an organic acid, and an acid derivative which can liberate acids in a hydrolysis process.

Claim 2 (Canceled).

Claim 3 (Previously Presented): A process as claimed in claim 1, wherein the wax has a melting point such that the wax melts during the reaction which results in the polyurethane.

Claim 4 (Previously Presented): A process as claimed in claim 1, wherein the wax has a heat of fusion of from 50 to 250 joules/gram.

Claim 5 (Previously Presented): A process as claimed in claim 1, wherein the melting point of the wax is from 20 to 150°C.

Claim 6 (Previously Presented): A process as claimed in claim 1, wherein the wax contains one or more polar groups.

Claim 7 (Canceled).

Claim 8 (Previously Presented): A process as claimed in claim 1, wherein the encapsulated inhibitors are present in particulate form.

Claim 9 (Previously Presented): A process as claimed in claim 8, wherein the particles have a median particle diameter of from 20 to 800 μm.

Claim 10 (Previously Presented): A polyurethane prepared by a process as claimed in claim 1.

Claim 11 (Previously Presented): The process as claimed in claim 1, wherein the inhibitor is at least one selected from the group consisting of an α,β-unsaturated compound, a carboxylic acid, a ketone and an aldehyde.

Claim 12 (Withdrawn): The process as claimed in claim 1, wherein the inhibitor is at least one selected from the group consisting of a lactone, a lactam, a cyclic ester, a cyclic sulfonic ester, and a sulfone.

Claim 13 (Previously Presented): The process as claimed in claim 1, wherein the inhibitor is encapsulated in a polar polyolefin wax.

Claim 14 (Previously Presented): The process as claimed in claim 13, wherein the polar polyolefin wax is at least one selected from the group consisting of a polyethylene, a polypropylene, and a polybut-1-ene having a weight average molecular weight of from 500 to 20,000.

Claim 15 (Previously Presented): The process as claimed in claim 1, wherein the inhibitors are present in an amount of from 0.5 to 10% by weight.

Claim 16 (Previously Presented): The process as claimed in claim 1, wherein the inhibitor is a polyurethane degradation inhibitor.

Claim 17 (Previously Presented): The process as claimed in claim 1, wherein the wax is at least one of a natural wax, a chemically modified wax and a synthetic wax, and has a melting point of from 20 to 150°C.

Claim 18 (Previously Presented): The process as claimed in claim 1, wherein the inhibitor is encapsulated in a wax having a melting point of from 20 to 150°C and a heat of fusion of from 50 to 250 joules/gram; and the inhibitor is at least one selected from the group consisting of an α,β-unsaturated compound, a carboxylic acid, a carboxylic acid derivative, a ketone, an aldehyde, a lactone, a lactam, a cyclic ether, a cyclic ester, a sulfonic acid, a cyclic

sulfonic ester, a sulfone, an organic cyclic compound, an organic acid, and an acid derivative which can liberate acids in a hydrolysis process.

Claim 19 (Withdrawn): The process as claimed in claim 1, wherein the inhibitor is an organic acid.

Claim 20 (Withdrawn): The process as claimed in claim 1, wherein the inhibitor is at least one selected from the group consisting of adipic acid, dimethylpropionic acid, and maleic anhydride.

Claim 21 (Withdrawn): The process as claimed in claim 19, further comprising:

counteracting cleavage of the polyurethane formed after the reacting;

wherein the counteracting is carried out with the inhibitor.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.